

New Method Attacks Bacterial Infections on Contact Lenses

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DENVER — Researchers at National Jewish Health and the University of Texas Southwestern Medical Center have discovered a new method to fight bacterial infections associated with contact lenses. The method may also have applications for bacterial infections associated with severe burns and [cystic fibrosis](#). The results were published online January 18 in the journal *Investigative Ophthalmology and Visual Science*.

“Infections by the bacteria *Pseudomonas aeruginosa* can cause severe scarring and vision loss when they spread to the cornea,” said senior author Jerry Nick, MD, Associate Professor of Medicine at National Jewish Health. “By breaking apart a molecular scaffolding that encases the organisms and makes them more difficult to eradicate, we were able to significantly reduce bacterial infection of the cornea.”

The eye normally fights infections through a variety of defense mechanisms including blinking of the eyes, which helps remove bacterial organisms from the surface of the eye. Contact lenses, however, inhibit the effectiveness of blinking eyelids.

Thus, bacteria can adhere to the surface of the contact lens that sits against the eye. If those bacteria infect the corneal surface they can destroy the delicate corneal cells, which can lead to scarring and vision loss. The condition is known as microbial keratitis, and affects about two to four lens wearers per 10,000 each year.

Eye infections can be treated with antibiotics. However, it can be difficult to eliminate the bacteria on the contact lenses, especially when they form a biofilm. A biofilm is a matrix that harbors and encases communities of the organisms, making them harder to eradicate.

The researchers confirmed [earlier findings that cellular debris from immune cells fighting the infection actually provide the raw materials for the biofilm](#) – DNA, actin and histones. So, they used the enzyme DNAase together with negatively charged poly aspartic acid to break down the chemical bonds of these elements that support the biofilm.

This treatment reduced biofilms on the contact lenses by 79.2 percent. The same treatment reduced infection of the cornea in an animal model by 41 percent. There was no evidence of any harm caused by the treatments.

“These are very promising early results that point to potentially new methods for removing bacterial biofilms from contact lens surfaces, thereby reducing the risk of microbial keratitis, as well as the for the treatment of infections by *Pseudomonas* that are associated with cystic fibrosis and severe burns,” said Danielle Robertson, OD, PhD, first author and Assistant Professor of Ophthalmology at UT Southwestern, and first author on the study.

National Jewish Health is the leading respiratory hospital in the nation. Founded 124 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the [media resources page](#).

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